

XX. *On some cases of Dimorphism and Polymorphism among Palæarctic Lepidoptera.* By SERGÉ ALPHÉ-RAKY, of St. Petersburg. Communicated by HENRY JOHN ELWES, F.L.S., F.Z.S., &c.

[Read August 5th, 1891.]

MANY authentic instances of dimorphism, or even polymorphism, in the female sex of various species of Lepidoptera are known to exist, but only a few such cases are generally acknowledged for the male sex. It is rather strange that, when in certain species the males are of one form [monomorphic], but the females dimorphic (whether the different forms are found together or in different localities widely apart), nobody seems to wonder at the fact; whereas, if females of supposed distinct species are absolutely identical in appearance, but their males dimorphic, such males are mostly treated as belonging to separate species.

Let us take, as an example, *Cleogene Niveata*, Sc. (= *Illibaria*, Hb.), from the Carniola and Styrian Alps, where both males and females are white, and the Pyrenean *Cleogene Peletieraria*, Dup., which differs, from the first, only in the male being of a dark slate-colour, and a trifle larger, as a rule.

The females of *Niveata* and *Peletieraria* are identical. We shall find but a small number of lepidopterists inclined to recognise in these two forms mere varieties of one and the same moth, which they most decidedly are.

It would have been still more difficult to have their specific identity admitted if both forms inhabited the same locality, as in some other cases, where dimorphic forms really do fly together.

Of generally acknowledged instances of dimorphism in the male sex there are but few, and these are of such an unmistakable and obvious character that no place for the slightest doubt is left, even for the most obstinate species separator. Among such cases it is enough to

mention *Colias Erate*, Esp., and its orange form, *Chrysodona*, B.; *Thais Medesicaste*, Ill., and its form, *Honoratii*, B. (so scarce, but so constant, too); *Chrysophanes Phleas*, L., with the dark form, *Eleus*, F., and the whitish ab. *Schmidtii*, Gerh. In these cases the dimorphic forms fly, in some localities, side by side, and are valuable as a proof that dimorphism in males does really exist.

Such forms as *Chrysophanes* ab. *Schmidtii* and *Thais* ab. *Honoratii* are generally considered as mere accidental varieties—*aberrations* of the typical forms; but, though scarce by themselves, being very constant in their distinctive characters, both ab. *Schmidtii* and ab. *Honoratii* must be regarded as true dimorphic forms, the more so, as in some analogous cases rare *aberrations* in one locality may become the constant form in others. I will now try to illustrate this by the following facts.

In the summer of 1867, when I was living near the Sea of Azov, at Taganrog, a friend of mine, Mr. William Daish, an Englishman, bred from numerous caterpillars of *Papilio Machaon*, L., an unusual and remarkably fine female imago, with an abnormal development of yellow scales on the wings and on the abdomen (the latter being entirely yellow) such as I had never seen in any other individual amidst numerous European specimens. This female was, consequently, a very remarkable aberration for the locality where it had been bred. Many years later, exactly similar specimens were found in Turkistan, near Samarkand and Marghelan; and the form has been described as var. *centralis* by Dr. Staudinger, who sees it in the second brood of the butterfly of those localities, whereas he says that the specimens of the first brood there do not differ from the ordinary European form.

I myself have long been of Dr. Staudinger's opinion as to two forms of the same species never flying side by side. This theory of my much esteemed and celebrated friend is, after all, as I now think, only so far correct, that it is not generally the case that constant varieties do fly together with their typical forms, and also as long as the variety is not a strictly dimorphic form of the type.* I have now come to the conviction that dimorphic

* I do not consider slight variations of colouring, size, form, and pattern of the wings as cases of dimorphism.

forms of a species which fly together, and which are, accordingly, considered as distinct species, do sometimes become constant and monomorphic representatives of the species in some other locality.

Lederer is one of the first who speaks of such a case in the 'Horæ Soc. Ent. Ross.,' vol. vi., pp. 79, 80. This sagacious entomologist says there, that he considers both *Lycæna Eurypilus*, Frér., and *L. Zephyrus*, Friv., as varieties of *L. Argus*, L. Although I cannot agree with Lederer in this last point, I am well convinced that he is right as regards the specific identity of *Zephyrus* and *Eurypilus*, these two *Lycænæ* being dimorphic forms of one species.

I had forgotten what Lederer had written on the subject till quite recently, when, having had to separate females of *Eurypilus* and *Zephyrus* from different localities that were intermingled, I was in some cases greatly puzzled, and could not with certainty decide to which of the two species the females belonged.

In looking over the works of those authors who were most likely to speak of these *Lycænæ*, I was glad to find in the above-mentioned paper Lederer's opinion in accordance with the conclusion I had arrived at myself, *i. e.*, that *Zephyrus* and *Eurypilus* are forms of one species, the only really characteristic distinction being in the blue and brown colouring of the respective males, whilst the females are alike—monomorphic.

This case is very instructive in many respects. In some countries, as, for example, in the North-east of Asia Minor (Pontus), and in Armenia, both forms—*Zephyrus* and *Eurypilus*—fly together; whereas they fly separately, as monomorphic forms, in other localities. So *Eurypilus* flies alone in some parts of Persia and in the North-western part of Asia Minor, whilst the blue-male form *Zephyrus* has not been found in some parts of Persia* and in the North-western part of Asia Minor, in the so-called Bithynia.

* I have seen a good number of *Eurypilus*, but no *Zephyrus* from Persia; and Mr. Herz, who has collected a great number of *Lycænæ* in Persia, has not met *Zephyrus* there, but only *Eurypilus*. Lederer says, *l. c.*, that he has only received *Eurypilus* from Astrabad, and Dr. Staudinger alone speaks of Persian *Zephyrus* in the 'Horæ Soc. Ent. Ross.,' vol. xiv., p. 235. *Zephyrus* must therefore be very local in Persia.

In Greece, in European Turkey, in Switzerland (here as a local variety, named *L. Lycidas*, Trapp.), and in Spain (here as var. *Hesperica*, Rbr.), *Zephyrus* only flies. In the country east of the Caspian Sea, and in Turkistan, we find this same *Zephyrus* with blue males, but slightly modified—var. *Zephyrinus*, Stgr. In all these last-named countries the form with the blue male appears to fly alone, and its range is perhaps greater still, as it is very probable that *L. Pylaon*, F. v. W., and *Cyane*, Ev., are also but varieties of *Zephyrus*. In this case, we find that the form with the dark brown male has a much smaller geographical distribution than the one with the blue male. But we shall soon see that in another similar case it is the reverse, the brown form being more widely distributed than the blue one.

I must here remark that Lederer speaks of intermediate forms between *Zephyrus* and *Argus* as found near Amasia, but Dr. Staudinger has not found such specimens in Lederer's collection. Mr. Cristoph also thinks* that some specimens of *Argus* in the Caucasus show a transition to *Zephyrus*, but, after a careful examination of such specimens, I think that they all belong to *Zephyrus*, this species being just as inclined to individual variation as *Argus*.

Does not this case of dimorphism indicate that other geographical varieties may have originated in the same way? Beginning by getting dimorphic in a certain locality, does not the species then spread in various directions under the one or the other form, according to which of the two is best fitted for the new locality, and for the probably modified conditions of existence?

Against Lederer's opinion as to *Eurypilus* and *Zephyrus* being varieties of *Argus*, and of *Zephyrus* and *Eurypilus* being dimorphic forms of one species, we have Dr. Staudinger's criticism in vol. xiv. of the 'Horæ Soc. Ent. Ross.,' p. 235, *et seq.*

Although I am quite of the Doctor's opinion concerning the specific distinctness of *Argus* and *Zephyrus-Eurypilus*, I find his endeavour to prove the distinctness of the two last-named forms insufficiently conclusive. One of his strongest arguments against the specific identity of these

* 'Mémoires sur les Lépidopt.,' N. M. Romanoff, vol. i., p. 51.

forms is that they fly in some localities side by side, which, as we know, he does not admit for forms of the same species. Then, after giving some details of lesser importance, by which *Eurypilus* is to be distinguished from *Zephyrus*, such as a darker brown under side of the wings of the first, as compared with the greyish under side of the wings of the second, &c., Dr. Staudinger acknowledges "that some of the females of *Eurypilus* and *Zephyrus* are not to be separated with certainty," and this statement of his is absolutely fatal to the cause he defends.

I think that I know of several other analogous cases in the same genus, but I do not think it prudent to speak of these before having studied them more thoroughly, as it is very easy to fall into grave errors in questions of so delicate a nature; and I will now pass to the following instance, which I have closely analysed, and in the truth of which I have no reason to doubt.

Those of my readers who may find interest in cases of dimorphism presented by some of our Palæarctic Rhopalocera are surely well enough acquainted with the *Lycenæ*,—*Admetus*, Esp., *Ripartii*, Frr., *Dolus*, Hb., and *Menalcas*, Frr.,—so that it is useless my recapitulating here the well-known differences which characterise these four forms. It is sufficient to remark that nearly all lepidopterists consider *L. Ripartii* as a mere variety of *L. Admetus*, and that *L. Menalcas* is considered as the Asia Minor form of *L. Dolus* of France and Piedmont. A good description of *L. Dolus*, Hb., under the name *Lefebvrei*, is given by Godart in his 'Encyclopédie Méthodique,' p. 695 (1819), but, as far as I know, Boisduval is the first who points out the affinities of *Dolus*, *Admetus*, and *Ripartii*. In his 'Icones Historiques,' p. 71, he says, speaking of *Dolus*:—"Cette espèce forme avec *Admetus* et *Ripartii*, un petit groupe fort remarquable par le duvet cotonneux, qui couvre une partie des ailes supérieures des mâles. On ne rencontre cette particularité dans aucune autre espèce connue." Freyer, in describing the *L. Menalcas*, is right when he believes it to be a variety of *Dolus*, Hb.

Dr. Staudinger, who, in the 'Horæ Soc. Ent. Ross.,' vol. xiv., p. 248, speaks of *Menalcas* and *Ripartii*, says that he fails to distinguish the females of these two

Lycænæ, but, in the same paper, speaking of *Admetus* and *Ripartii*, he expresses a certain doubt as to these last two belonging to one species.

Now we know that, in reality, the last two forms differ only in *Ripartii* having a distinct white streak on the under side of the hind posterior wings, which is deficient in *Admetus*.

Dr. Staudinger next speaks of intermediate forms, found in Asia Minor, with the streak partly present. Such intermediate forms he is inclined to consider as hybrids of *Admetus* and *Ripartii*. But this same streak is so variable in the intricate *Lycæna Damon*, Schiff., group, that it has entirely lost, in my opinion, any importance as a specific character.

Having lately had the opportunity of closely examining specimens of *Admetus*, *Ripartii*, *Dolus*, and *Menalcas*, having done it with the greatest care and with the aid of good magnifying glasses, having weighed all the pros and the cons of the question, I now firmly believe that all four forms belong to one species. We consequently have, in France, *Dolus* and *Ripartii* as dimorphic forms of a species which, in Asia Minor, occurs in three forms — *Admetus*, *Ripartii*, and *Menalcas*. The whitish-blue forms, *Dolus* and *Menalcas*, are found nowhere independently from *Ripartii*; whilst the latter and *Admetus* do occur in certain countries as constant and perfectly monomorphic forms.

I firmly believe that when the majority of similar instances of dimorphism or polymorphism have been recorded, it will be found that the number of such cases in the male sex of Palearctic Lepidoptera is by no means inferior to the number of cases presented by the female sex.